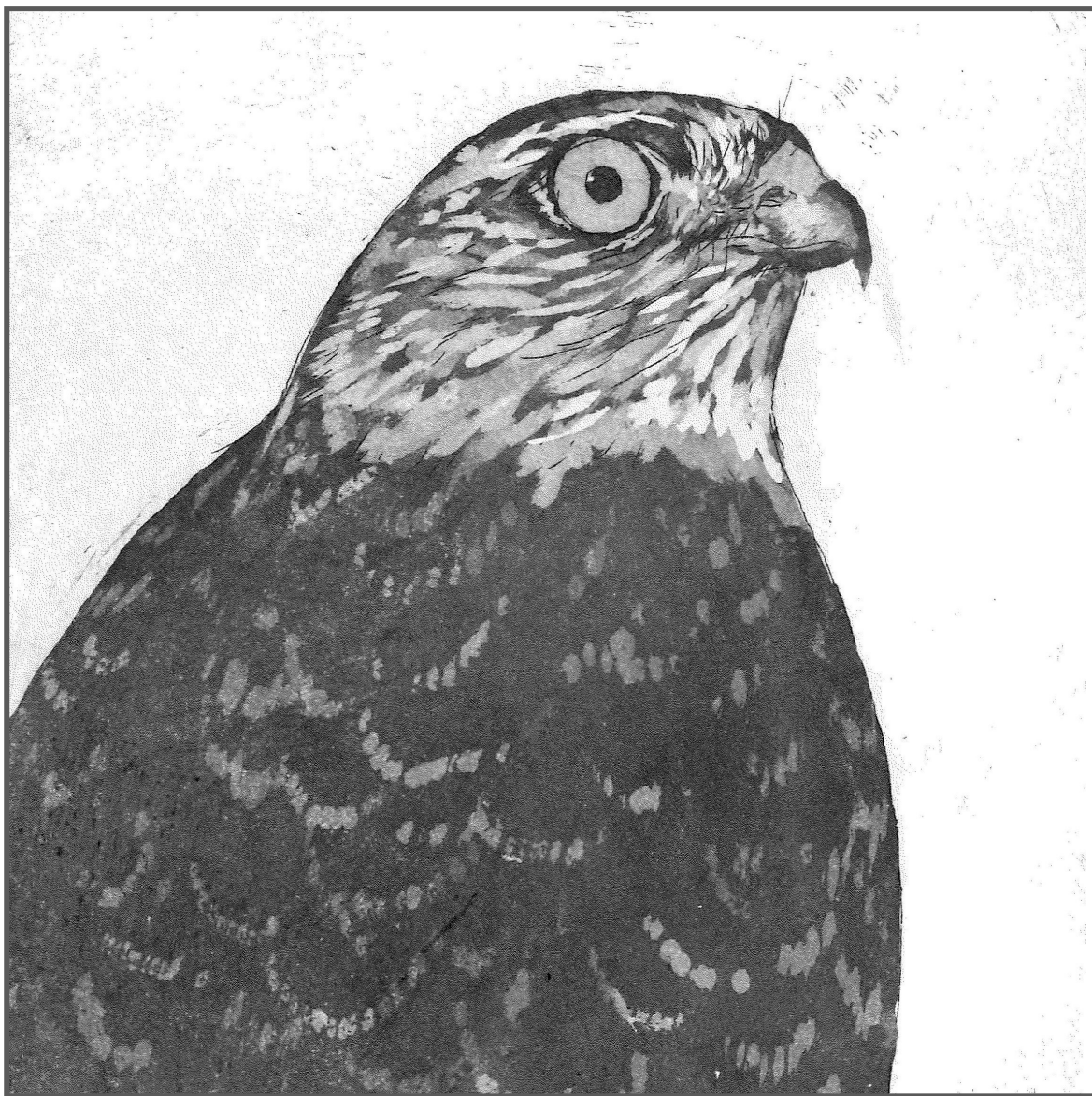


Golden Gate Raptor Observatory
Season Summary 2019



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GOLDEN GATE
NATIONAL
PARKS
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Hawkwatcher Bright Winn monitors the East Quadrant. Illustration by Emma Regnier.

GOLDEN GATE RAPTOR OBSERVATORY

The Golden Gate Raptor Observatory is a program of the Golden Gate National Parks Conservancy in cooperation with the National Park Service, and is made up of 240 community volunteers and a small staff. GGRO's mission is to inspire the preservation of California raptors. Each year, we monitor and study the bird of prey migration on the central California coast, particularly at the Marin Headlands, part of the Golden Gate National Recreation Area. We are dedicated to the conservation of raptors both through careful data collection and through involving the public in every aspect of our research.

Our deep gratitude to the Gregory Hind Endowment Fund for critical support of the GGRO.

GGRO Season Summary 2019

Compiled and edited by Kelsie McInnis.

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Requests for or questions about GGRO data should be addressed to ggro@parksconservancy.org.

Cover: Sharp-shinned Hawk. Illustration by Siobhan Ruck.

G G R O S T A F F

ALLEN FISH, GGRO DIRECTOR • KELSIE MCINNIS, OPERATIONS MANAGER
TERESA ELY, BANDING MANAGER • STEP WILSON, HAWKWATCH & OUTREACH MANAGER
BUZZ HULL, RESEARCH DIRECTOR EMERITUS
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SHARON FARRELL, EXECUTIVE VICE PRESIDENT, PROJECTS, STEWARDSHIP AND SCIENCE, GGNPC
BILL MERKLE, WILDLIFE ECOLOGIST, GGNRA

I N T R O D U C T I O N

Invested in Eagles

It is Halloween day 2019 and I'm with the Thursday 2 team on Hawk Hill, covering the South Quadrant. Southies have the dual role of being both raptor counters and visitor counters. I notice a group of small people coming up the northwest trail toward Hawk Hill's summit. Counting front to back I total about fifteen *NatureBridge* kids, mostly ten and eleven-year olds. They just climbed the 900-foot elevation from Rodeo Lagoon to the summit of Hawk Hill. I note that the last kid is taller than the rest and then teacher Brian Westlund stretches his arm high in the air in a wave for my benefit.

I haven't seen Brian yet this migration season, so I check with my count leader and momentarily abandon my quadrant and walk the few hundred feet to where he is letting the kids catch their first views of the Golden Gate. They "ooh" and "aah" like they are looking off the summit of Denali. Brian and I shake hands and start to chat—then suddenly—the hawkwatch team is yelling at us. We both turn and twenty hawk counters are pointing past us toward the Gate. They are scoping and pointing, and I hear "Bald!" in the hub of the hollering. Brian turns the kids' attention toward the south, and there she is, just rounding the corner rising into our view: a full adult Bald Eagle, perhaps female because she's just so big.

The eagle rises to eye-level and I cannot use my binoculars because she is just that close. I recall thinking that her left wing was extended half the distance from her body to our group. Her left eye rested so briefly on us, each now agape at her nearness and magnificence. As quickly as she had come into view, she passed us by and glided past the hawkwatchers, framed briefly by the towers of the Golden Gate Bridge. I was too slow with my camera so my brain took the photo: north tower, Bald Eagle, south tower. I can still pull it up today, two months later.

What does it mean for a ten-year old kid to see a wild Bald Eagle up close? Not in a zoo, or as a rehabbed or falconer's bird. Not on a television show. But to carry with you, at ten years old, the life experience of seeing a wild eagle, to gauge it for yourself, to bank it in your memory. It is yours. It is you. It is personal now—you are a person who has seen a wild eagle. You are invested in eagles.

GGRO has many accomplishments each year: monitoring California's raptors, tracking raptor movements, bringing the community into the scientific process, connecting people deeply with this magnificent national park. But perhaps none is more important than this: we help kids and adults become invested in eagles. That's where conservation starts.

The GGRO is managed by the Golden Gate National Parks Conservancy. Our Projects, Science and Stewardship Department works in close coordination with the National Park Service, and with a heroic population of nearly 250 community volunteers to make our work possible. Add to that more than 500 GGRO donors and benefactors, and a dozen cooperating scientific institutions. The bottom line? Many individuals contribute time and energy to make the GGRO's annual autumn raptor migration study possible. I wish I could name you all here, but space does not allow. I trust you know who you are. You have our deepest gratitude. And the raptors—in their hawkish way—thank you also.

Yours in bird conservation,



— Allen Fish, GGRO Director



*Adult Bald Eagle in flight.
Illustration by Emma Regnier.*

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Anne Ardillo

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Michael Armer

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Dennis Davison

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Tom Holmes

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Buzz Hull

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Mamiko Kawaguchi

John Keane

Brigid Keegan

Mary Kenney

Jane Kim

*2019 intern Paula Eberle
holds a juvenile Red-
shouldered Hawk. Illustration
by Emma Regnier.*



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Hawkwatcher's scope. Illustration by Emma Regnier.

H A W K W A T C H

RAPTOR-SIGHTINGS IN THE MARIN HEADLANDS DURING AUTUMN

	2019 Season*		Past 10-Year Average (2007–2018)**	
	(443 hours)		(478 hours)	
	Sightings	Raptors/hour	Sightings	Raptors/hour
Turkey Vulture	7340	16.57	7577	15.81
Osprey	58	0.13	74	0.15
White-tailed Kite	31	0.07	68	0.14
Bald Eagle	19	0.04	9	0.02
Northern Harrier	807	1.82	562	1.18
Sharp-shinned Hawk	2021	4.56	3666	7.67
Cooper's Hawk	2629	5.93	2330	4.87
Northern Goshawk	0	0	1	< 0.01
Red-shouldered Hawk	280	0.63	445	0.93
Broad-winged Hawk	110	0.25	286	0.60
Swainson's Hawk	4	0.01	8	0.02
Red-tailed Hawk	8248	18.62	8477	17.73
Ferruginous Hawk	17	0.04	28	0.06
Rough-legged Hawk	8	0.02	5	0.01
Golden Eagle	13	0.03	18	0.04
American Kestrel	286	0.65	349	0.73
Merlin	156	0.35	187	0.39
Peregrine Falcon	196	0.44	233	0.49
Prairie Falcon	0	0	5	0.01
Unidentified	784	1.77	1059	2.22
Total	23,007	51.93	25,387	53.11

*2019 hawk count lost six days due to power shutdowns and park closures

**2010 and 2013 data not included due to partial season

D A Y L E A D E R S

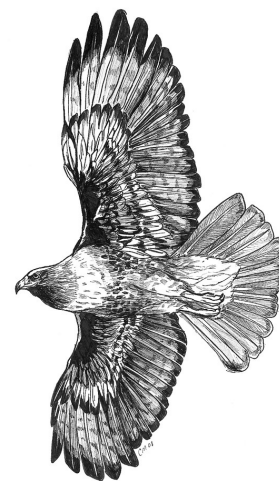
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 BRIAN O'LAUGHLIN • JAMES RAIVES • JANE RUDEBUSCH • HOLLY THOMAS • STEP WILSON

H A W K W A T C H

The 2019 hawkwatch began with species diversity. The first week counted thirteen of the seventeen species seen this fall. Standouts during the first week included the Wednesday 1 team seeing a Sharp-shinned Hawk and an adult Ferruginous Hawk. Although Sharpies are our third-highest counted species, we usually don't see them during the first couple weeks. Thursday 1 identified two Golden Eagles and Friday 1 counted a Bald Eagle. Fog rolled in Saturday, but the Sunday 1 team picked up the first Peregrine Falcon of the season to mark the thirteenth species seen for the week. Week two saw a couple more Sharpies and Wednesday 2 and Thursday 2 teams had eight species seen for the day, but fog was the dominant factor for the week.

This season, we thankfully didn't lose as many count days due to unhealthy air quality as we did in the last two years, but we didn't count for six days due to red-flag fire warnings and power shutdowns. Many thanks to volunteer teams for their consistency and diligence during this time. This new situation was difficult to comprehend, and disseminating logistics was challenging. The Conservancy and NPS leadership met daily to determine best practices. We were always well informed, and consideration for our volunteer staff was maintained during their decision-making. All of us at GGRO thank Park leadership not only for their guidance and support, but also for their understanding and cooperation during the PG&E power shutdowns to reduce wildfire risk during high wind days.

— Step Wilson, Hawkwatch Manager



Red-tailed Hawk in flight.
Illustration by Caitlin Morrow.

O U T R E A C H

Everything at GGRO could be called outreach. The efficiency and elegance of a community science program is that outreach happens at every juncture: volunteers daily advancing in their knowledge of raptor biology and their skills as field biologists; classes visiting Hawk Hill for an hour of hawkwatching; birders spending days spotting hawks, practicing their craft; the thousands of tourists each fall who have no idea, until they arrive on the Hill, that magnificent birds are flying above this magnificent bridge.

Well over a thousand people participated in GGRO's weekend Hawk Talks last September and October, many witnessing the release of a banded raptor by a GGRO volunteer or intern. One of the true highlights of 2019 was hosting a Hawk Hill visit from former NPS Director Jon Jarvis and a delegation from the Chinese National Parks—thanks to GGNRA Chief of Natural Resource Management and Science Alison Forrestel for this opportunity. Jarvis is currently head of UC Berkeley's *Institute for Parks, People and Biodiversity*.

Our classroom program, *Migratory Story*, is now a five-year collaboration with the Crissy Field Center—the Parks Conservancy's phenomenal youth science education center. In 2019, more than 200 fifth graders from fourteen different San Francisco Unified School District classes participated in a three-part *Migratory Story* journey. They learned the wheres and whys of the raptor migration, visited Hawk Hill for a first-hand look, then returned to the classroom to explore the meaning of migrations and movements in our human lives.

The following groups shared in the GGRO experience in 2019, attending programs on or off the Hill: Berkeley Art Museum and Film Archives; California Academy of Sciences; Chesapeake Bay Conservancy, Corporación Amigos de los Parques de la Patagonia, Feminist Bird Club SF Bay Area Chapter, Fort Miley Veterans Administration, GGNPC Park Academy, Marin County Open Space District, Marin Environmental Forum, Master Birding Course, National Park Service Bay Area Network, San Mateo County Migration Symposium, Santa Rosa Bird Rescue, Sonoma State University, UCB Alumni, UCB Museum of Vertebrate Zoology, UCB Neurozoology class, many Audubon chapters, and a number of school groups from throughout the Bay Area.

— Allen Fish, Director

D O C E N T S

EDDIE BARTLEY • CARMEN DELEON • PAULA EBERLE • TERESA ELY • ALLEN FISH
JEREMY PALLANT • CRAIG NIKITAS • EMMA REGNIER • LYNN SCHOFIELD • STEP WILSON

B A N D I N G

RAPTORS Banded in the Marin Headlands during Autumn

	2019* (8/12/2019–1/2/2020)	Annual Average 1993–2018**	Totals 1983–2019
Northern Harrier	10	10.31	333
Sharp-shinned Hawk	181	470.12	13,254
Cooper's Hawk	596	556.62	16,786
Northern Goshawk	0	0.23	7
Red-shouldered Hawk	15	16.15	480
Broad-winged Hawk	0	1.58	46
Swainson's Hawk	0	0.38	11
Red-tailed Hawk	227	306.92	10,551
Ferruginous Hawk	0	0.04	3
Rough-legged Hawk	0	0.15	6
Golden Eagle	0	0.04	2
American Kestrel	10	52.19	1492
Merlin	23	31.00	840
Peregrine Falcon	7	4.27	124
Prairie Falcon	0	1.77	50
Eurasian Kestrel	0	0.04	1
Total	1069	1452	43,996

**Data compiled by Teresa Ely; 2019 data are through January 2, 2020; 2019 banding lost six days due to power shutdowns and park closures*

***1993-2018 are used for this comparison due to similarity of methods and effort between those years and 2019*



Metal bands. Designed by Bill Prochnow.

D A Y L E A D E R S

ANNE ARDILLO • MICHAEL ARMER • EDDIE BARTLEY • ROBYN BOOTHBY • NANCY BRINK • CARMEN DeLEON
 TERESA ELY • ANASTASIA ENNIS • LIEF GALLAGHER • BUZZ HULL • JOSH HULL • MAMIKO KAWAGUCHI
 JOHN KEANE • CRAIG NIKITAS • CLAIRE O'NEIL • JEFF ROBINSON • LYNN SCHOFIELD

B A N D I N G

2019 started off strong compared to the 10-year average and by mid-September it seemed like it would be an average season. However, when peak came, the Sharp-shinned Hawks never manifested. By the end of the season, we had banded about 40% of the 10-year average. This is the second-lowest year on record for Sharp-shinned Hawks banded; 2013 was lower by eight birds.* However, 2013 was the year the government shutdown kept banders out of the field for two weeks in early October, so 2019 could be the lowest Sharpie year to date. High winds, power outages, and smoke, prevented banding for six days.

Cooper's Hawks showed up in strong numbers and got us over the 1000-bird hump. We only banded ten Kestrels this season, the lowest since 1991 when only two were banded. We continued the streak of high Peregrines banded, catching seven this year. And we had an above-average Harrier year with ten banded this season. We placed 178 color bands on Redtails and five on Peregrines this season. We tagged one hatch-year Turkey Vulture in August that had been rehabbed at UC Davis. 2019 did not lend us many opportunities to trap more Turkey Vultures, but we will restart efforts in 2020. To date, ten of the twelve tagged vultures have been re-sighted. Two of these birds, #368 and #372, are regulars in the Headlands.

We had four journey-level banders and three interns pass the siteleader certification process this season. Congrats and welcome! Thank you to all the banders for taking the time and energy to support and train our nineteen apprentices this season.

— Teresa Ely, Banding Manager

**Years with four blinds in operation*

R E S E A R C H

Along with generating an enormous amount of new information on California raptor movements and ecology, the GGRO relies on excellent relationships with more than a dozen academic labs, government agencies, and NGO's to leverage the greatest amount of science from our work. Many research projects take years to develop, analyze, and produce results; more years are required to publish. In 2019, our collaborations resulted in three journal publications, two from Dr. Joshua Hull's lab at the University of California, Davis, and one from Dr. Chris Briggs' lab at Hamilton College in New York.

The two UC Davis articles were headed up by doctoral candidate and GGRO bander, Ryan Bourbour. One was a collaborative paper with the US Fish and Wildlife Service examining mercury loads in feathers at migration stations like GGRO across the United States. The other was a methodological review of a technique pioneered in the Hull lab—using DNA to determine prey species by swabbing the bills and feet of the raptors.

Bourbour, RP, BL Martinico, MM Crane, AC Hull, and JM Hull. 2019. Messy eaters: Swabbing prey DNA from the exterior of inconspicuous predators when foraging cannot be observed. *Ecology and Evolution* doi: 10.1002/ece3.4866.

Bourbour, RP, BL Martinico, JT Ackerman, MP Herzog, AC Hull, AM Fish, and JM Hull. 2019. Interspecies, temporal, and geographic comparisons of feather mercury concentrations in North American raptors sampled at migration monitoring stations. *Ecotoxicology* doi: 10.1007/s10646-019-0216-2.

Hamilton College undergrad and former GGRO intern Laura Kwasnoski led an analysis looking for health impacts of rat poisons on Red-tailed Hawks. Laura included the work and talents of two other former GGRO interns, Kristina Dudus and Emily Abernathy, in her research.

Kwasnoski, LA, KA Dudus, AM Fish, EV Abernathy, and CW Briggs. 2019. Examining sublethal effects of anticoagulant rodenticides on haemosporidian parasitemia and body condition in migratory Red-tailed Hawks. *Journal of Raptor Research* 53 (4): 402-409.

Many other GGRO research projects are in the works, saplings moving toward tree status in the coming years. Three manuscripts have been submitted for publication in 2020. If there is a common theme in the more than eighty scientific articles produced through the GGRO, it would have to be collaboration—between academics and volunteers, between agency biologists and grad students—to getting the science done and out to the world.

— Allen Fish, Director

D O N O R S

**Indicates donors who contributed to the Data Analysis and Publication (DAP) fund*

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Perched Cooper's Hawk. Illustration by Val Martino.

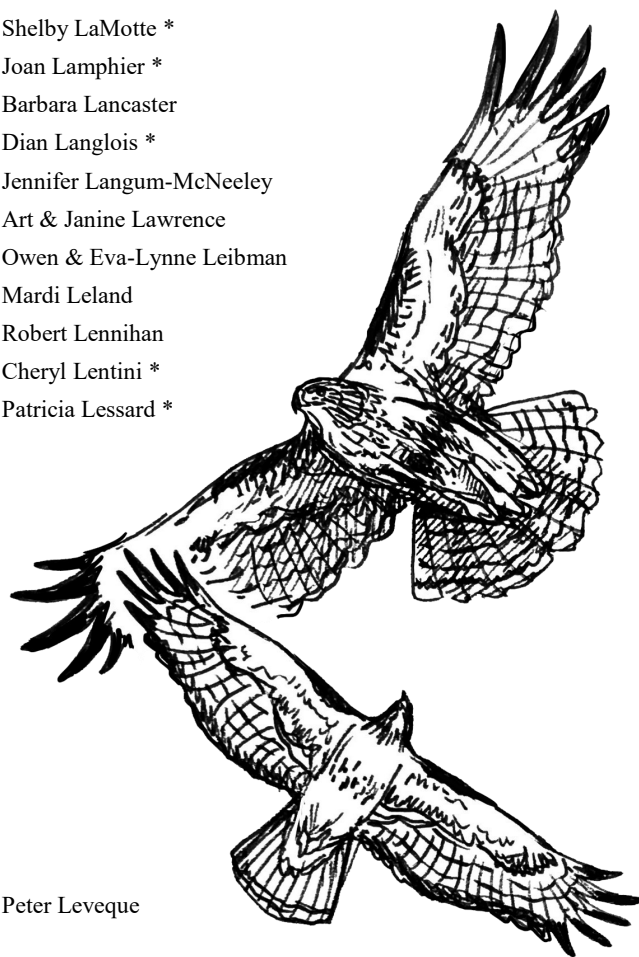
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Keith Gress	Peter & Lindsay Joost		
Christine Grogan	Barbara Jording		
Jeffrey Gualco	Karl Kaalstad		



Peter Leveque

Juvenile and adult Red-tailed Hawks. Illustration by Emma Regnier.

D O N O R S



Bander Sarah Parnell holds a juvenile Red-tailed Hawk for a wing photo. Illustration by Emma Regnier.

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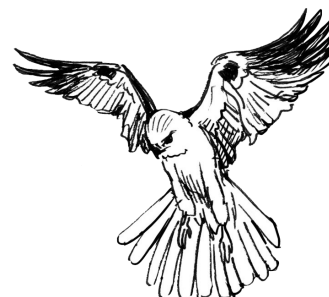
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*White-tailed Kite. Illustration
by Emma Regnier.*

NUMBER OF RAPTORS BANDED 1983–2019, MARIN HEADLANDS*

	1983-2012	2013	2014	2015	2016	2017	2018	2019	Total
Turkey Vulture	n/a	n/a	n/a	n/a	n/a	5	5	1	11
Northern Harrier	275	10	18	8	3	3	6	10	333
Sharp-shinned Hawk	10,799	173	414	481	463	330	413	181	13,254
Cooper's Hawk	13,199	390	485	649	503	496	468	596	16,788
Northern Goshawk	5	0	0	1	0	0	1	0	7
Red-shouldered Hawk	359	21	25	33	12	3	12	15	480
Broad-winged Hawk	31	3	1	3	2	1	5	0	46
Swainson's Hawk	10	0	0	0	0	1	0	0	11
Red-tailed Hawk	8635	433	222	251	229	212	342	227	10,551
Ferruginous Hawk	2	0	0	0	0	1	0	0	3
Rough-legged Hawk	5	1	0	0	0	0	0	0	6
Golden Eagle	2	0	0	0	0	0	0	0	2
American Kestrel	1284	37	49	41	24	21	26	10	149
Merlin	618	24	33	50	34	37	21	23	840
Peregrine Falcon	86	2	2	2	9	11	5	7	124
Prairie Falcon	39	2	2	3	2	1	1	0	50
Eurasian Kestrel	1	0	0	0	0	0	0	0	1
Total		1096	1251	1522	1281	1122	1305	1070	43,997

*2013 banding lost sixteen regular season days due to government shutdown; 2018 banding lost twelve regular season days due to hazardous fire smoke and thirteen post-season days due to government shutdown; 2019 banding lost six days due to power shutdowns and park closures

NUMBER OF RAPTOR-SIGHTINGS 2008–2019, MARIN HEADLANDS*

Hours	2008	2009	2011	2012	2014	2015	2016	2017**	2018	2019
Turkey Vulture	525	497	439	442	488	540	443	474	408	443
Osprey	7529	8060	6447	6622	8433	9692	5998	7063	6694	7340
White-tailed Kite	88	81	57	62	79	83	67	63	67	58
Bald Eagle	74	93	74	129	73	36	20	61	52	31
Northern Harrier	6	10	9	8	9	8	8	17	14	19
Sharp-shinned Hawk	454	614	335	523	394	442	354	905	600	807
Cooper's Hawk	4091	3332	2622	3149	3539	4652	4138	3107	3389	2021
Northern Goshawk	1956	1738	1805	2695	2169	3106	1998	2198	1914	2629
Red-shouldered Hawk	2	1	0	0	0	2	0	0	3	0
Broad-winged Hawk	559	529	248	604	578	574	265	220	362	280
Swainson's Hawk	131	180	203	756	310	344	289	286	295	110
Red-tailed Hawk	1	1	13	11	10	6	5	13	5	4
Ferruginous Hawk	6862	8297	7530	8601	7559	10017	5676	9132	9230	8248
Rough-legged Hawk	15	11	18	32	19	73	48	20	29	17
Golden Eagle	4	2	0	19	1	1	4	1	8	8
American Kestrel	18	11	9	13	32	18	13	16	14	13
Merlin	377	458	358	396	380	297	229	268	349	286
Peregrine Falcon	184	149	166	180	183	257	178	252	182	156
Prairie Falcon	224	259	264	246	279	225	199	252	205	196
Unidentified	7	9	2	8	7	6	2	5	2	0
	904	991	1011	1084	1159	1381	862	906	909	784
Total	23,486	24,826	21,171	25,138	25,213	31,220	20,353	24,785	24,323	23,007
Raptor Activity (raptors per hour)	44.7	50.0	48.2	56.9	51.7	57.8	41.2	52.3	59.7	51.9

*2010 and 2013 data not included due to partial season; 2018 hawk count lost twelve days due to hazardous fire smoke; 2019 hawk count lost six days due to power shutdowns and park closures

**2017 hours corrected from previous publications

Golden Gate Raptor Observatory

Golden Gate National Parks Conservancy

Building 1064 Fort Cronkhite

Sausalito, California 94965

GGRO Season Summary 2019



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GGRO celebrated its 35th year in 2019. 35-year design by Lynn Bantley.